



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/629,014

07/29/2003

Guy M. Cohen

YOR920000173US2

7623

28211

7590

05/24/2004

FREDERICK W. GIBB, III
MCGINN & GIBB, PLLC
2568-A RIVA ROAD
SUITE 304
ANNAPOLIS, MD 21401

EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/629,014

Applicant(s)

COHEN ET AL.

Examiner

Samuel A Gebremariam

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings were received on 3/4/04. These drawings are acceptable.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 24-29, 31-35, and 37-38 are rejected under 35 U.S.C. 102(b) as anticipated by Lee et al. (Super Self-aligned Double-Gate (SSDG) MOSFETS Utilizing Oxidation Rate Difference and Selective Epitaxy, IEEE, 1999, pp71-74).

Regarding claim 24, Lee teaches (fig. 1) an integrated circuit comprising: a channel region fig. 1c, page 71 1st paragraph); a top gate (TG) above the channel region; bottom gate (BG) below the channel region; and spacers (fig. 1e) adjacent the top gate and the bottom gate, wherein the spacers comprise a material that is independent of the material of the top gate and the bottom gate (the gate material of both the top and bottom gates is doped polysilicon while the spacer is silicon oxide).

Regarding claim 25, Lee teaches the entire claimed structure of claim 1 above including the top gate and the bottom gate comprise the same material (fig. 1c and fabrication steps).

Regarding claim 26, Lee teaches the entire claimed structure of claim 24 above including the top gate and the bottom gate comprise an insulator.

The limitation that spacer is deposited is not given patentable weight, because it is considered to be a product-by-process claim. "[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 27, Lee teaches the entire claimed structure of claim 24 above including source and drain regions adjacent the top gate and the bottom gate, wherein the spacers separate the source and drain regions from the top gate and the bottom gate (fig. 1e and 1f).

Regarding claim 28, Lee teaches the entire claimed structure of claim 24 above including the spacers comprise upper spacers and lower spacers separated by the channel (fig. 1e).

Regarding claim 29, Lee teaches the entire claimed structure of claim 24 above including the spacers comprise lower spacers adjacent a lower section of the top gate and upper spacers adjacent an upper section of the top gate (fig. 1e, Lee's top gate is considered to have lower spacers that are adjacent to the lower section of the top gate and upper spacers that are adjacent to the upper section of the top gate).

Regarding claim 31, Lee teaches the entire claimed structure of claim 29 above including source and drain regions adjacent the top gate wherein the lower spacers are

Art Unit: 2811

adjacent the source and drain regions and the upper spacers are at a level above the source and drain regions (fig. 1e).

Regarding claim 32, Lee teaches the entire claimed structure of claim 29 above including the upper spacers and the lower spacers are above the channel region.

Regarding claim 33, Lee teaches the entire claimed structure of claim 29 above including third spacers adjacent the bottom gate.

Regarding claim 34, Lee teaches the entire claimed structure of claim 29 above including source and drain regions adjacent the lower section of the top gate.

Regarding claim 35, Lee teaches the entire claimed structure of claims 29 and 32-34 above including silicide regions along upper portions of the source and drain regions, wherein the silicide regions are adjacent a point where the upper spacers meet the lower spacers (see fig. 1e).

Regarding claims 37 and 38, Lee teaches the entire claimed structure of claims 33 and 35 above including the upper spacers and the lower spacers are above the channel region (fig. 1e).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 30 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Akatsu et al. U.S. patent No. 6,281,084.

Art Unit: 2811

Lee teaches substantially the entire claimed structure of claims 29 and 35 above except explicitly stating that the lower spacers comprise a different material than the upper spacers.

It is conventional and also taught by Akatsu (fig. 4) forming gate structure (20) with lower spacer (36) comprising different material than the upper spacers (28).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a gate structure comprising of different materials as taught by Akatsu in the structure of Lee in order form integrated structure with high packing density.

Conclusion

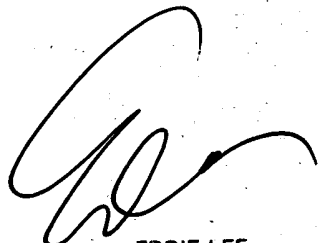
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A Gebremariam whose telephone number is (571)-272-1653. The examiner can normally be reached on 8:00am-4:30pm.

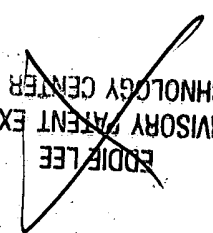
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAG
May 16, 2004


EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800


EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800